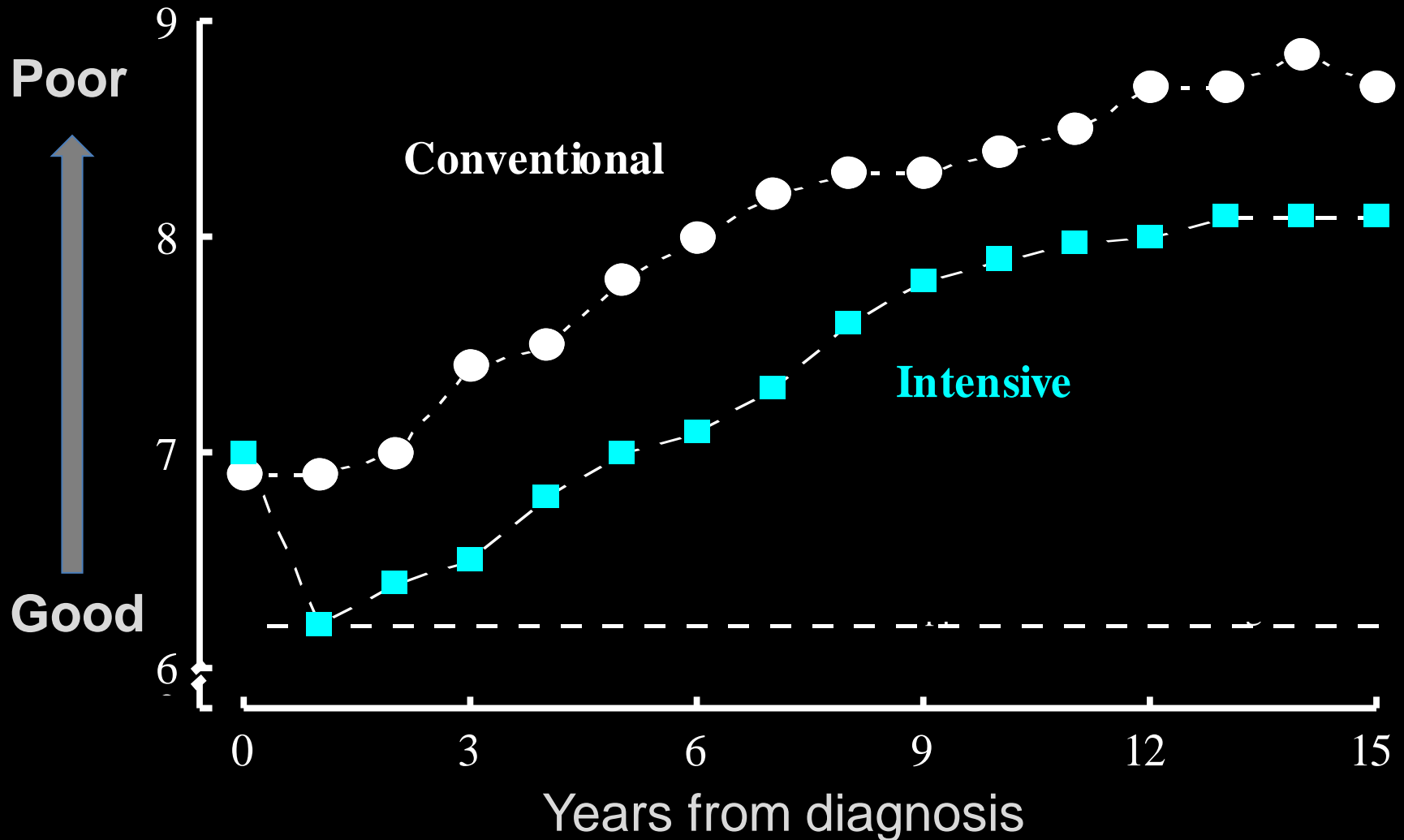


# Weight loss to restore Beta Cell Function: A cure for type 2 diabetes?

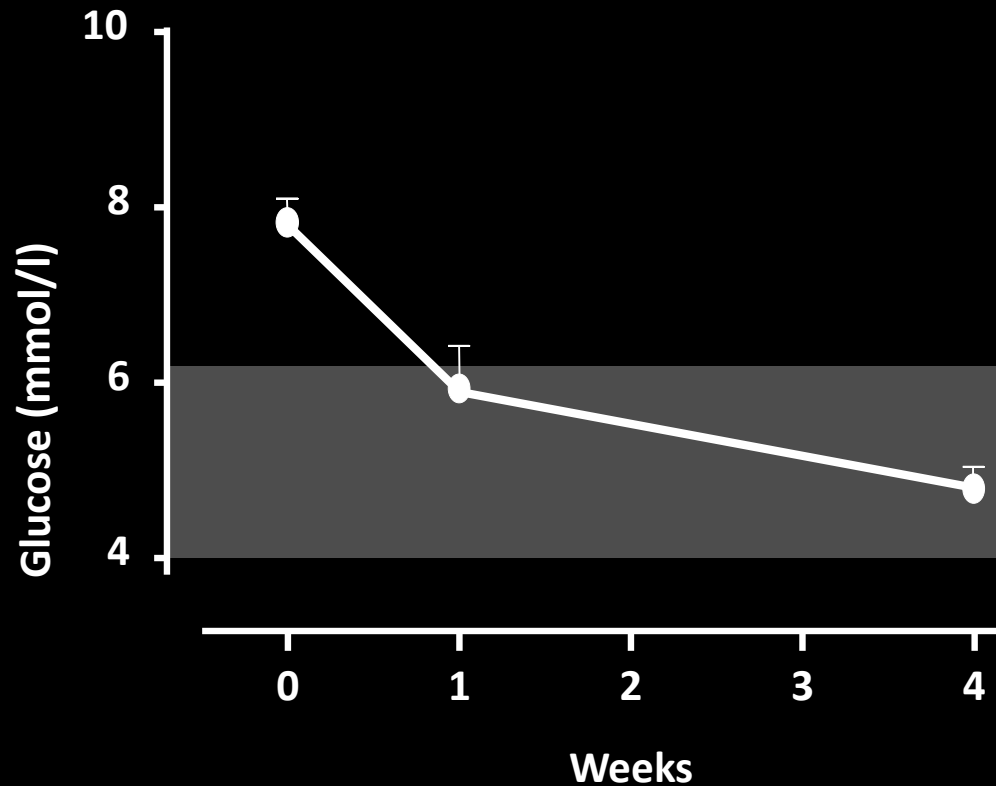
Roy Taylor

# The nature of type 2 diabetes:

## UKPDS- Loss of control over time



# Change in fasting plasma glucose after gastric bypass surgery







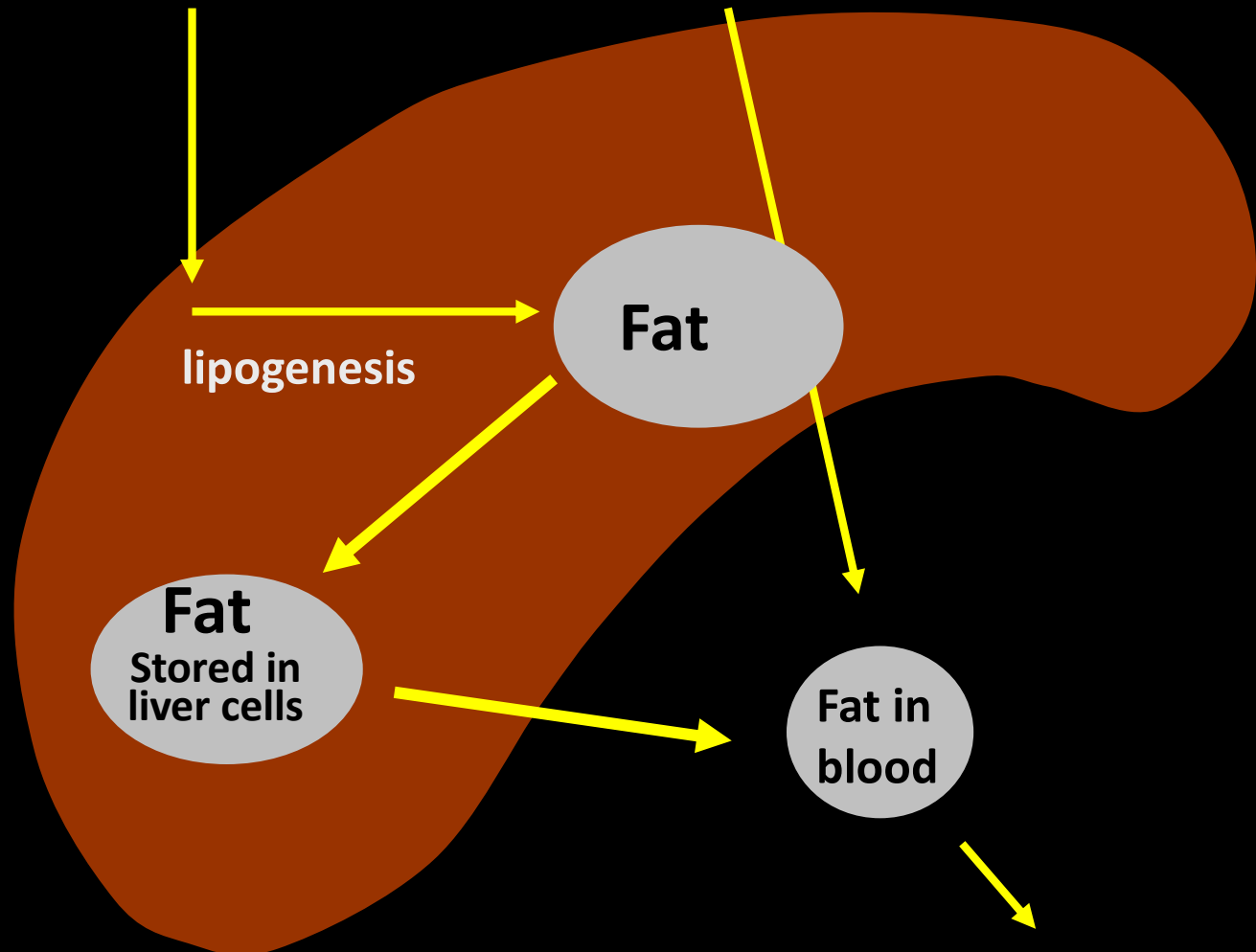


**Food**



**Glucose**

**Fat**



# **Liver glucose production overnight – amount made in 1 hour:**

**Person  
with  
diabetes**



**Person  
without  
diabetes**

## Six hours of liver glucose production in type 2 diabetes



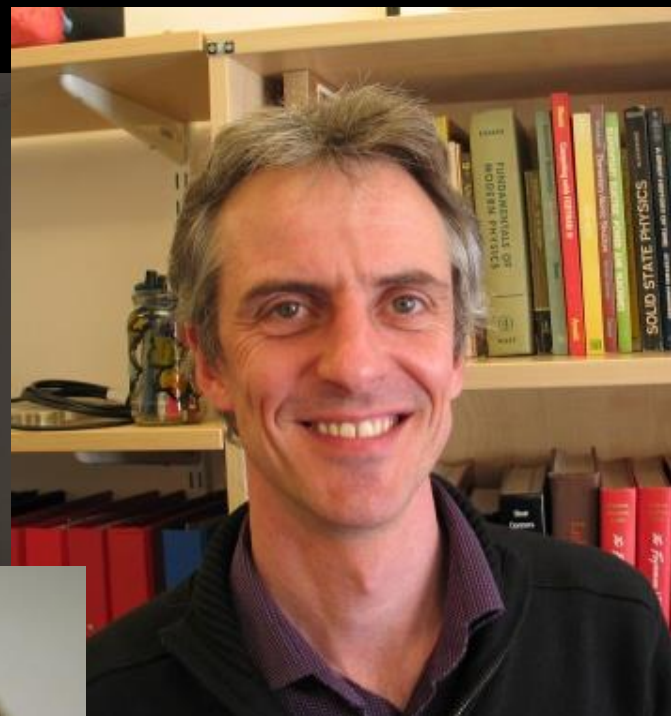
# The twin cycle hypothesis

Substantial weight loss in people with type 2 diabetes will:









**Andy Blamire**



**Kieren Hollingsworth**



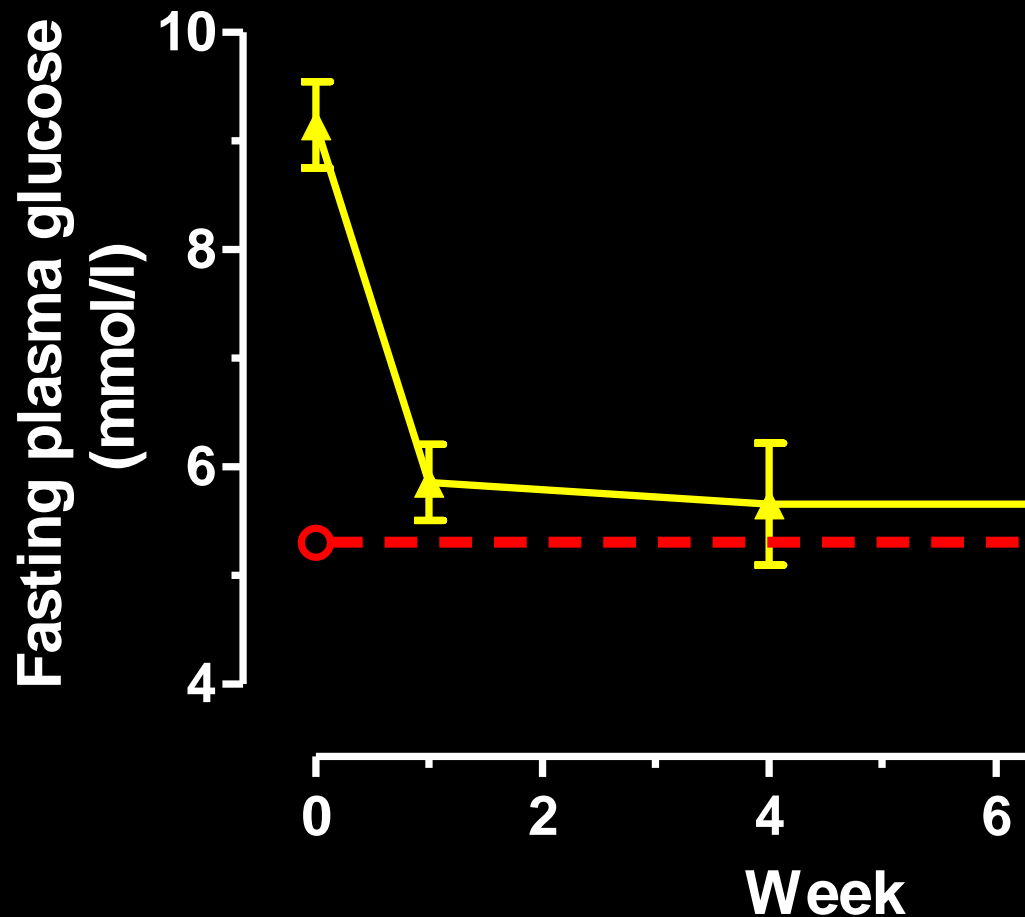
**Pete Thelwall**



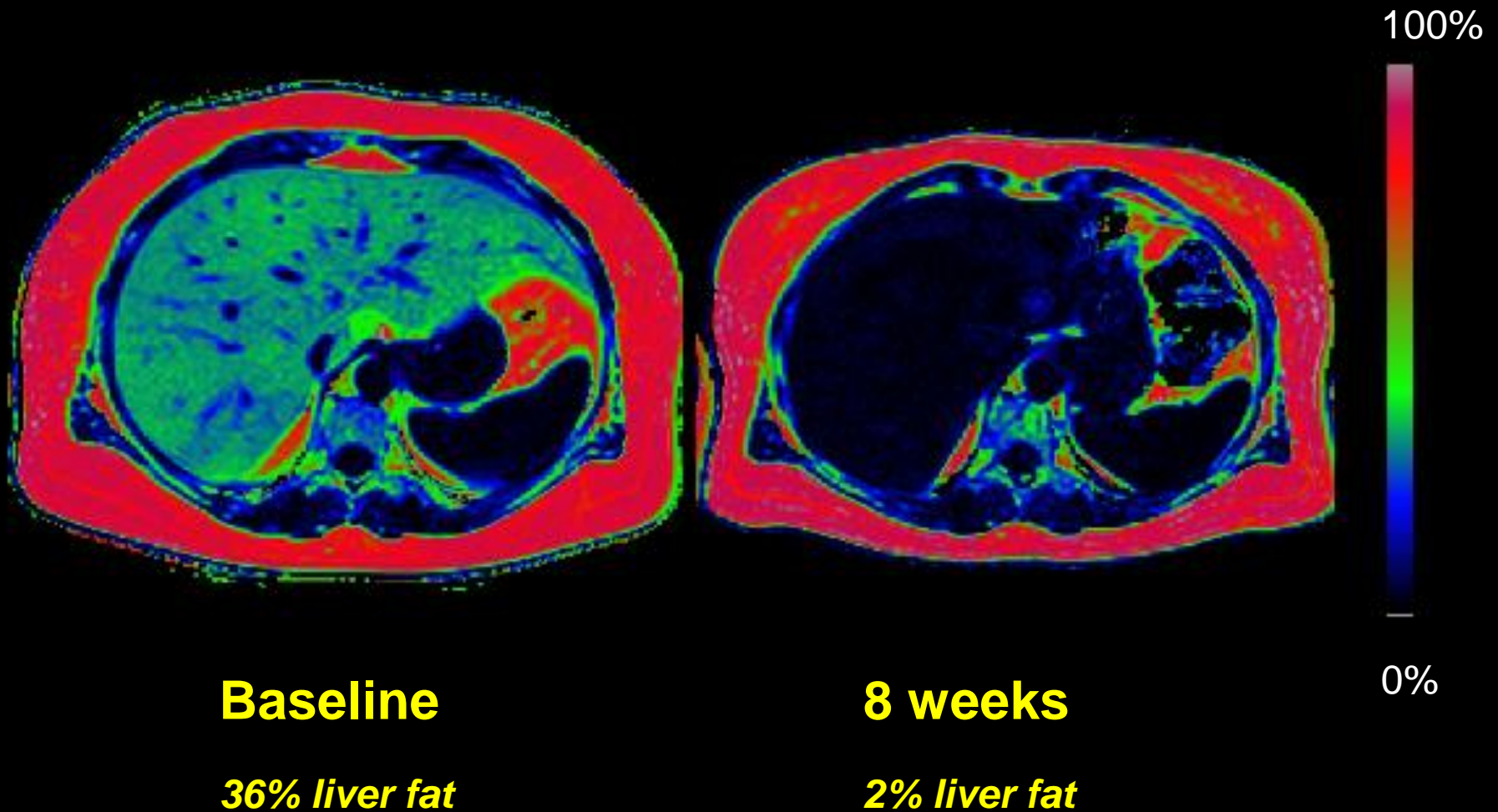


# Blood glucose

Average: 9.2  $\rightarrow$  5.9 mmol/l ( $p=0.003$ )

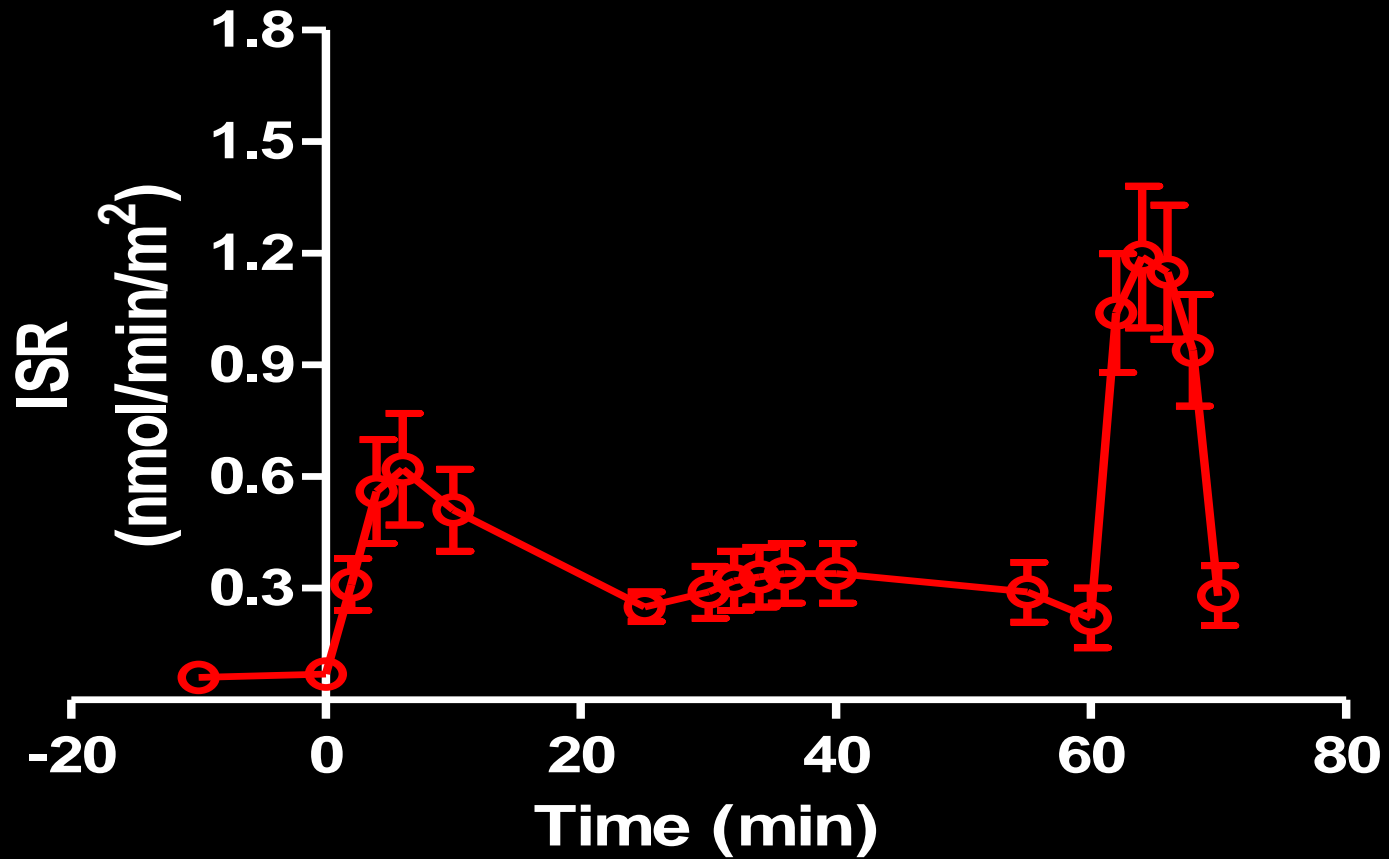


# Change in liver fat content



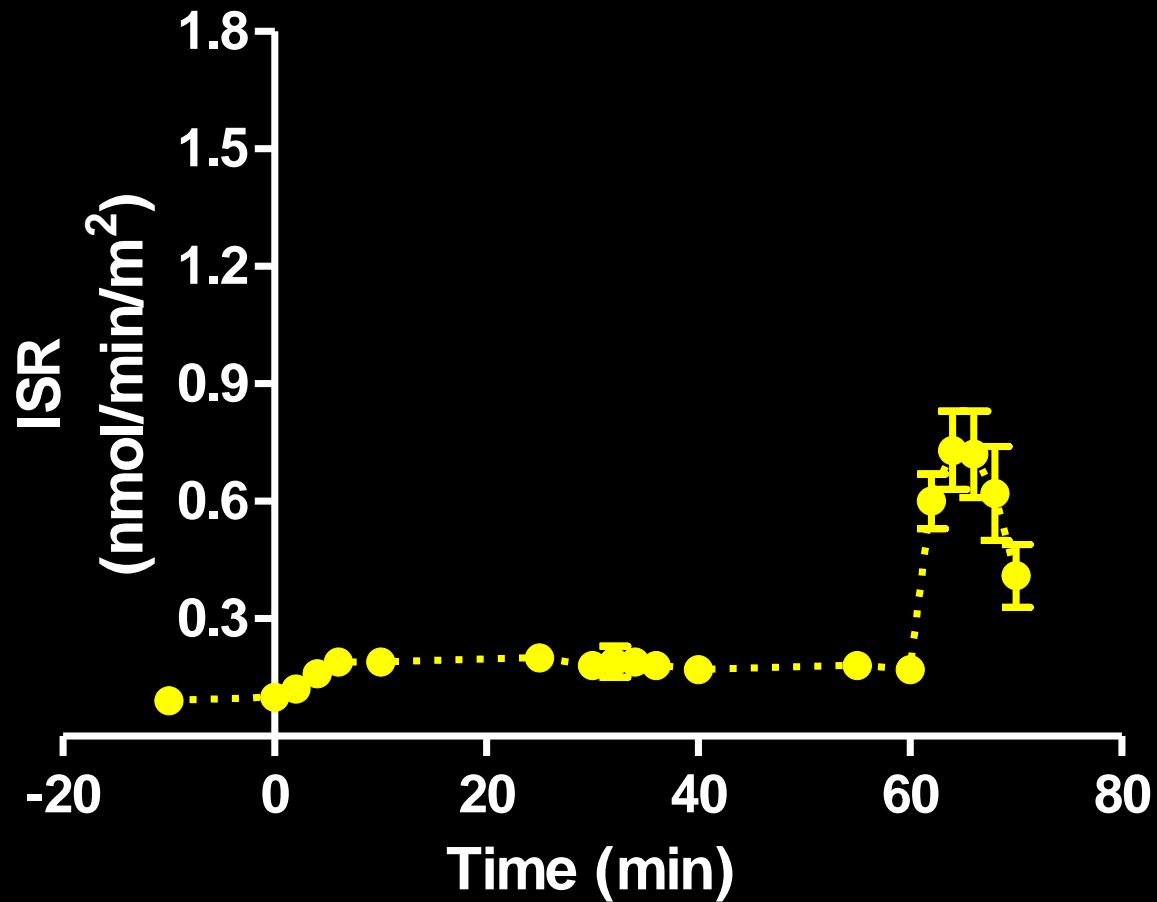


## Beta cell function: Normal



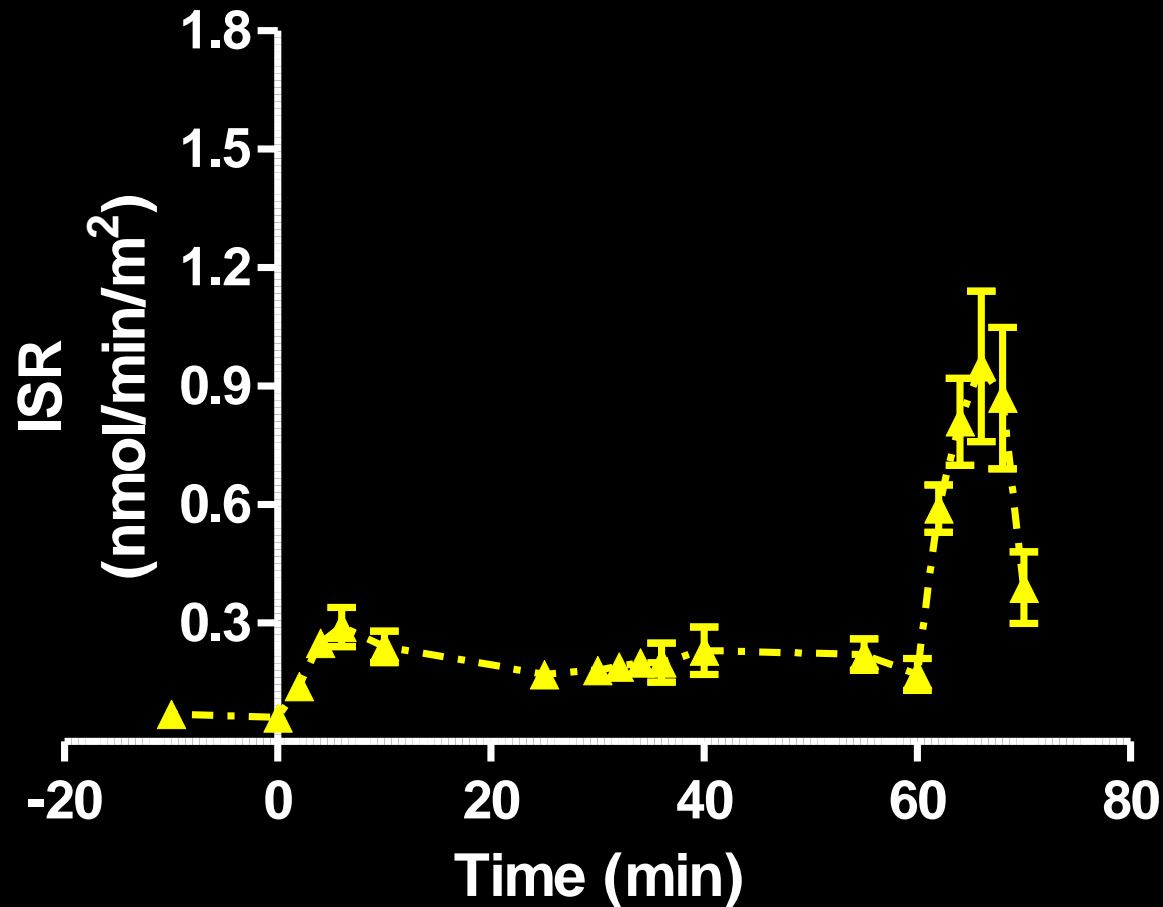
# Beta cell function: Diabetes

## Baseline



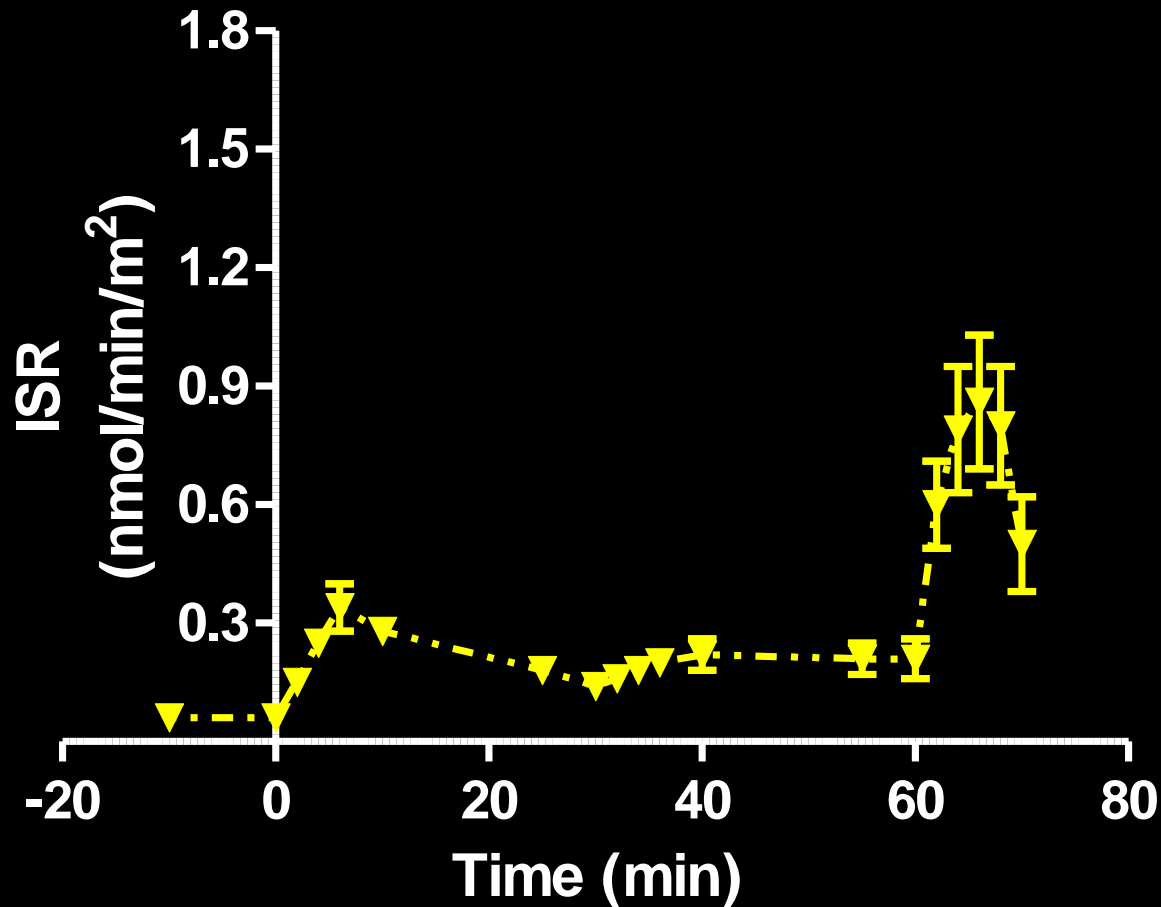
# Beta cell function: Diabetes

Week 1



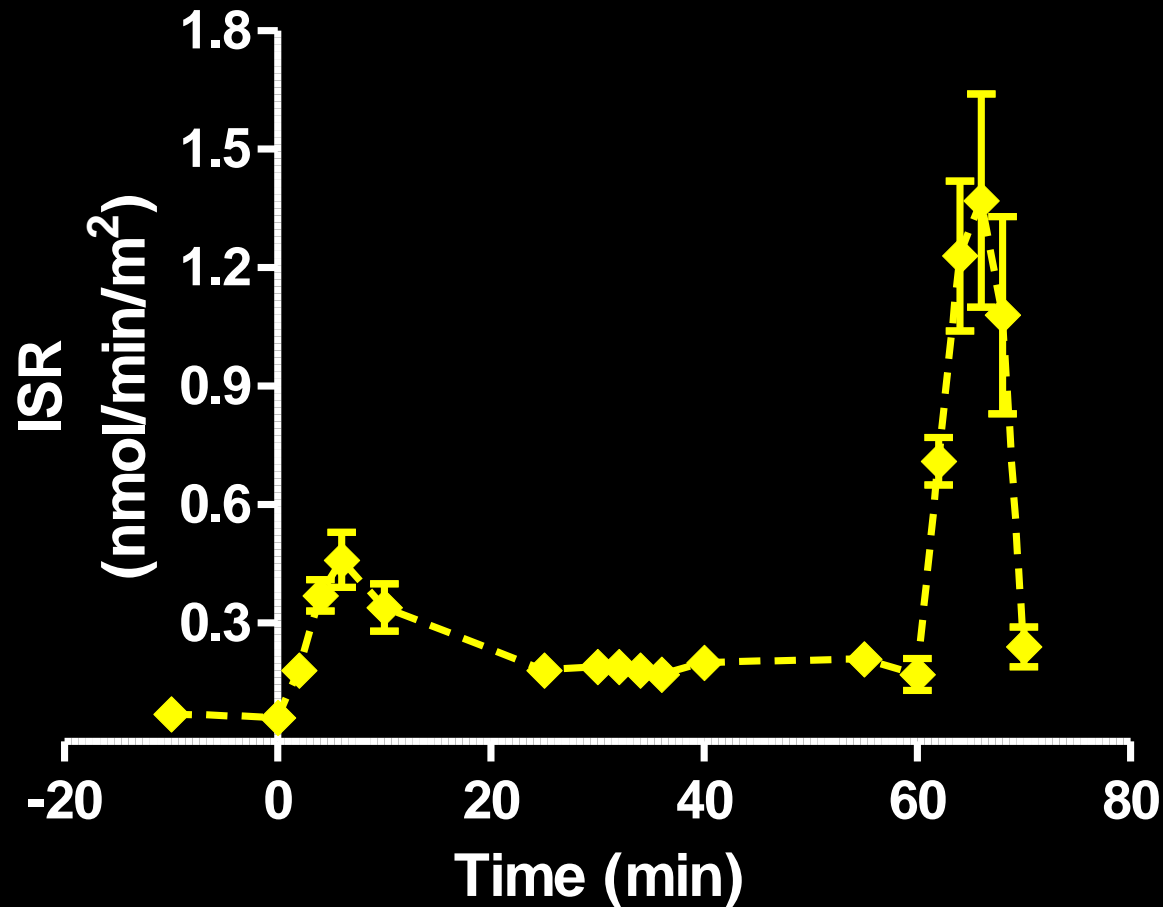
# Beta cell function: Diabetes

Week 4



# Beta cell function: Diabetes

Week 8













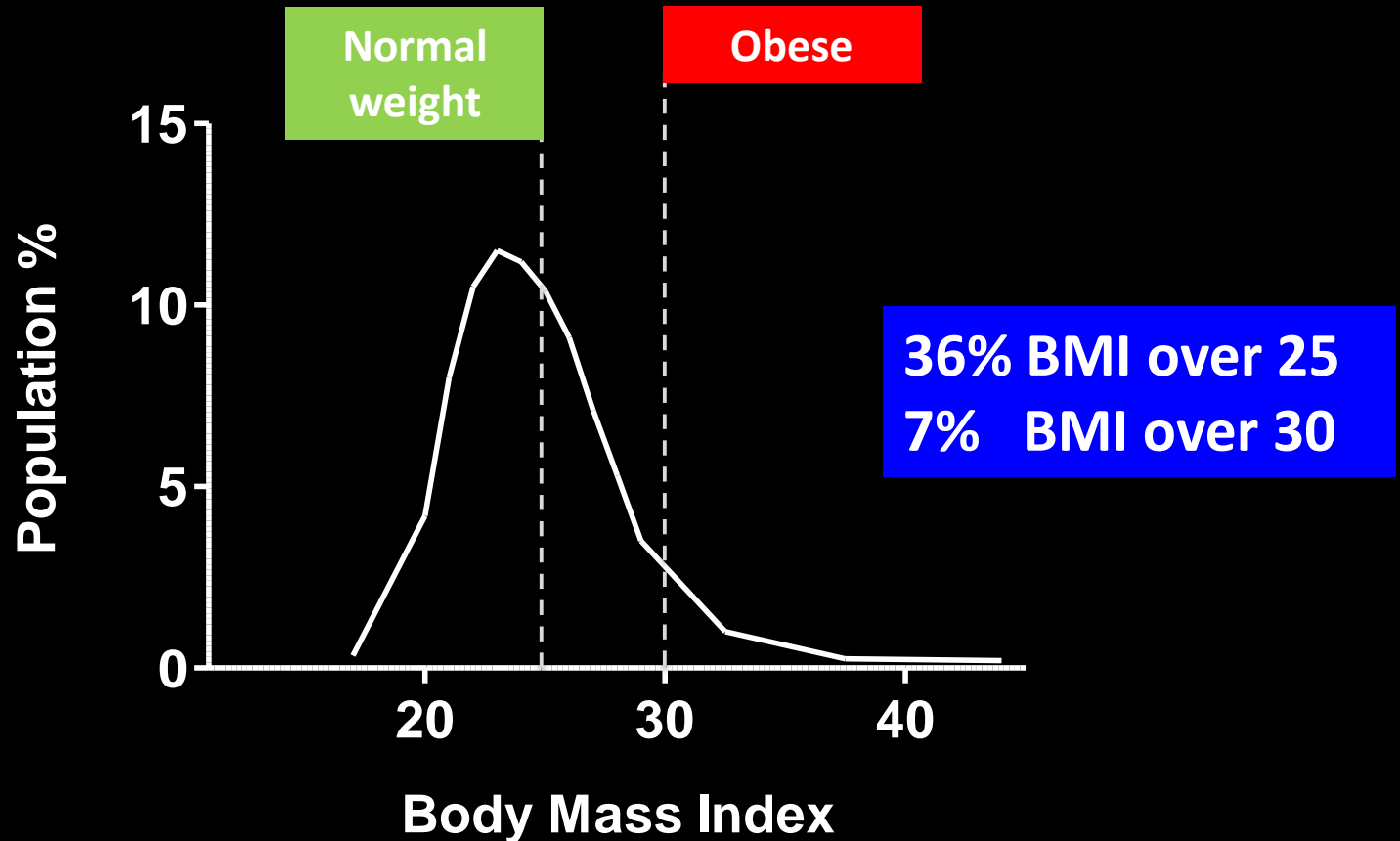
Newcastle ladies ~1980





Newcastle ladies – Daily Mail 2010

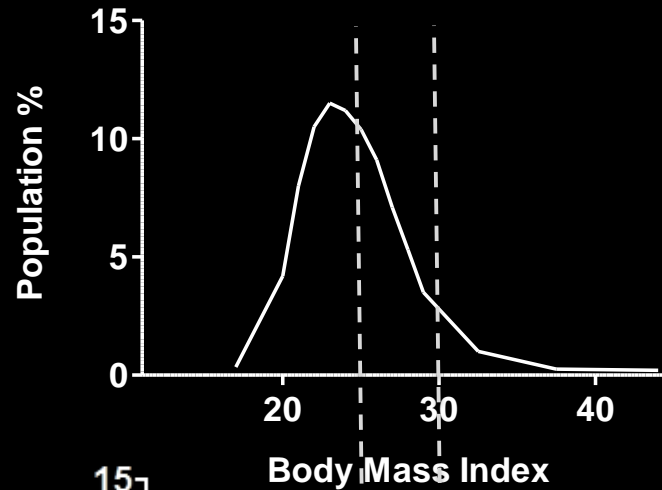
# BMI distribution in UK - 1980





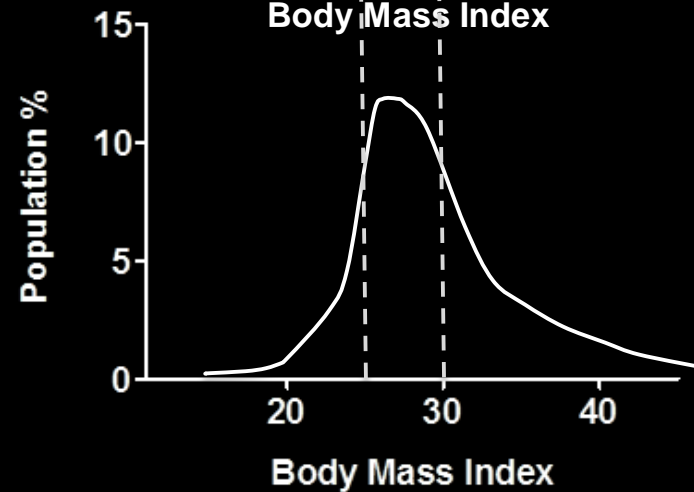
# BMI distribution in UK – 1980 and 2010

**1980**



**36% - over 25**  
**7% - over 30**

**2010**



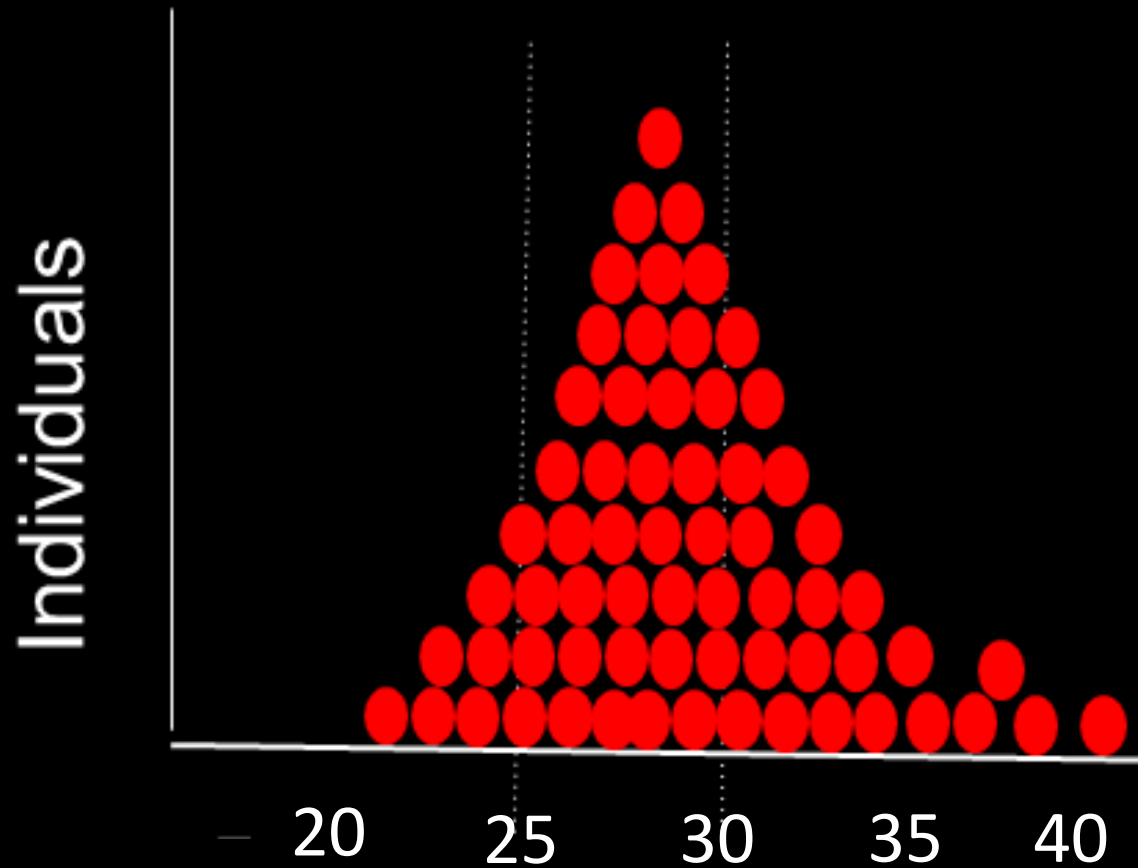
**65% - over 25**  
**25% - over 30**

**Why have I developed type 2 diabetes?**

**All my friends are fatter than me,  
but they do not have diabetes.**

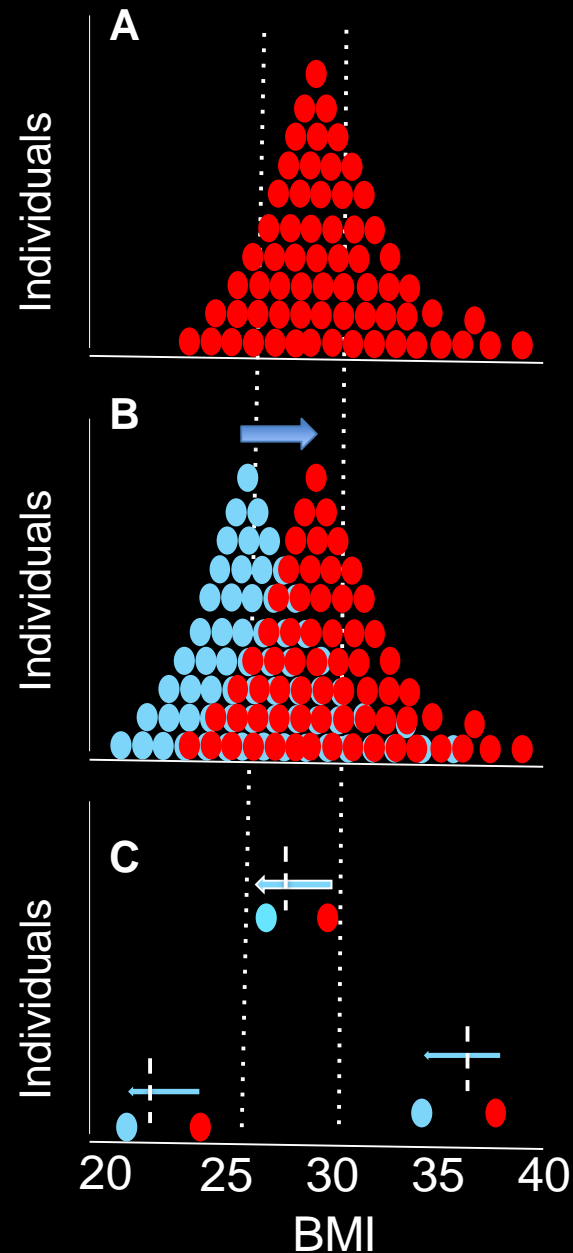
**Type 2 diabetes - A disease of obesity ?**

# BMI distribution of individuals with type 2 diabetes



# Personal vs population

**The Personal  
Fat Threshold**



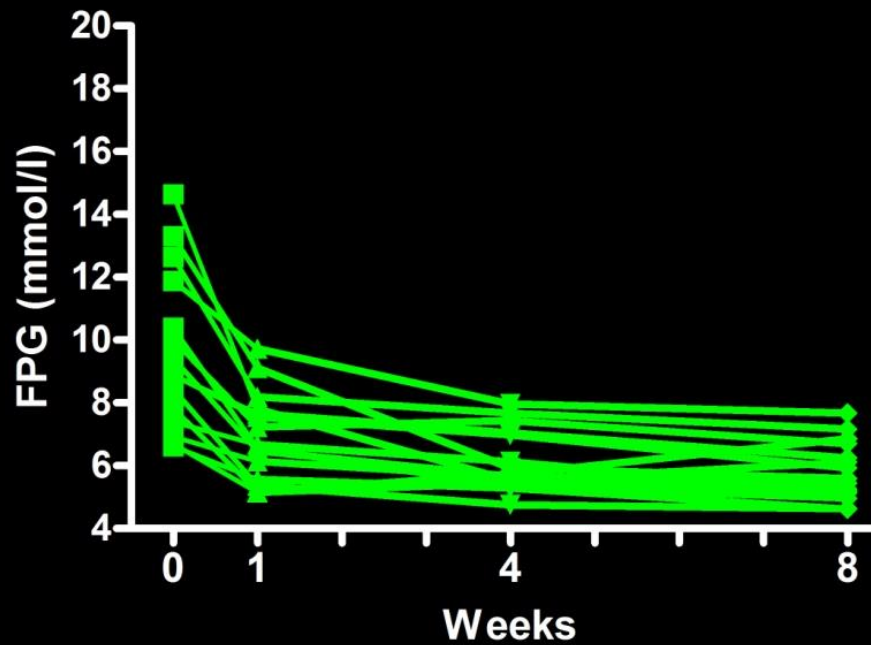




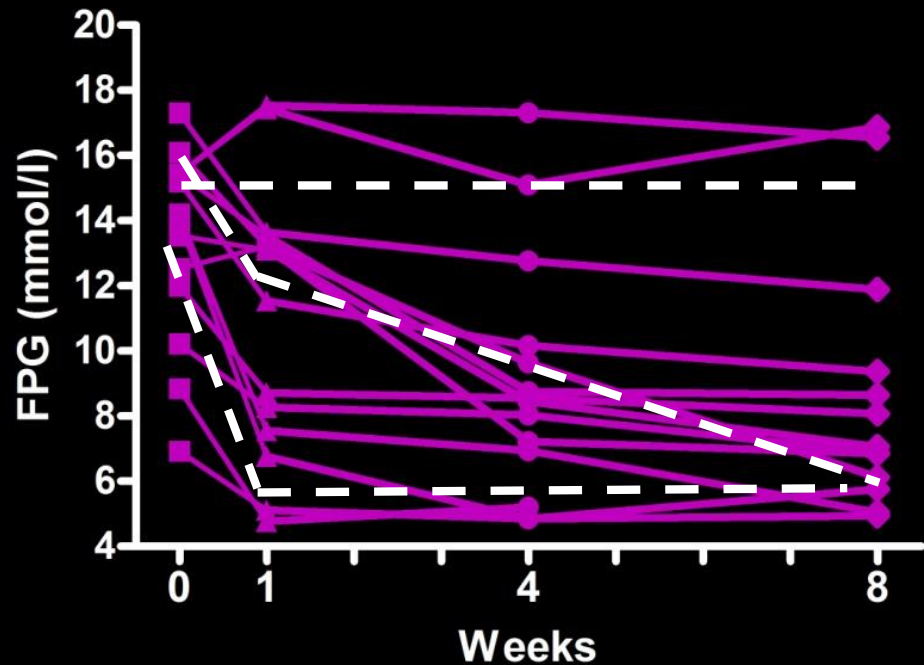


# Fasting plasma glucose

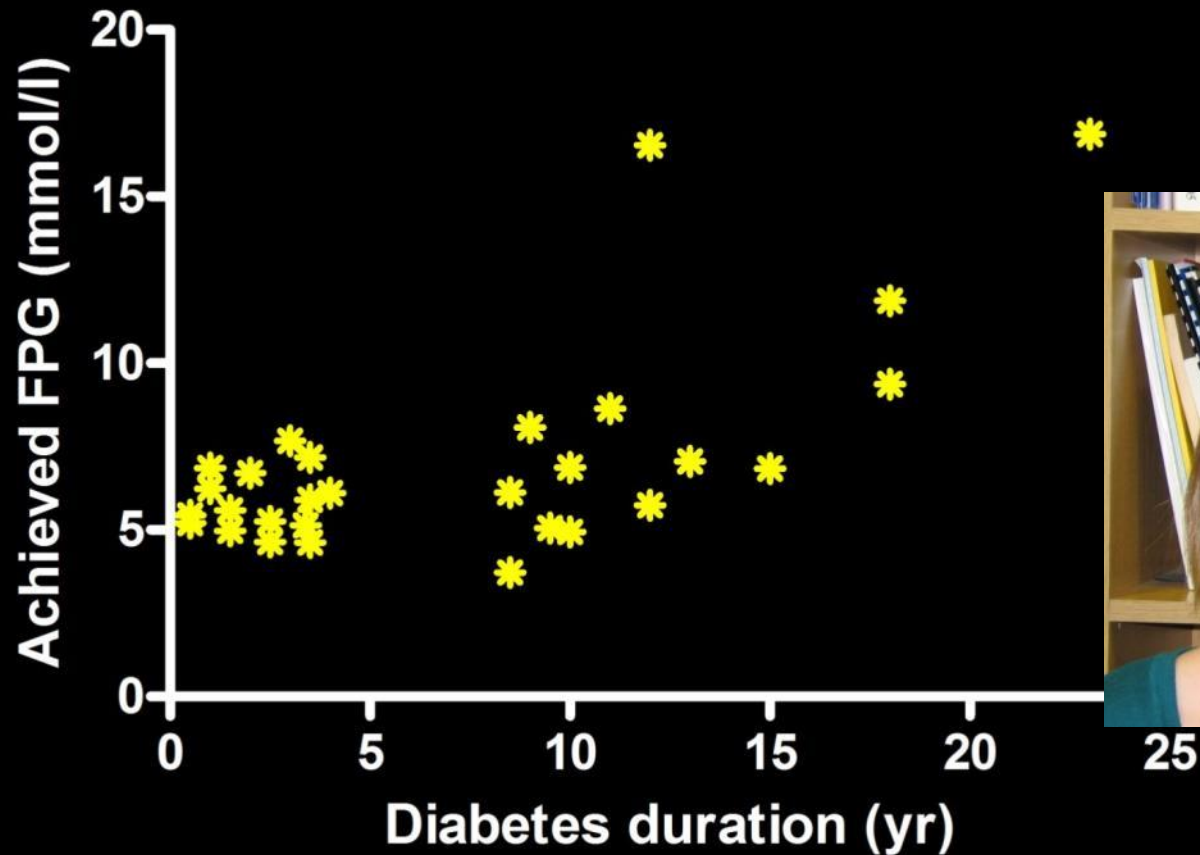
Short duration



Long duration



# Reversibility by diabetes duration

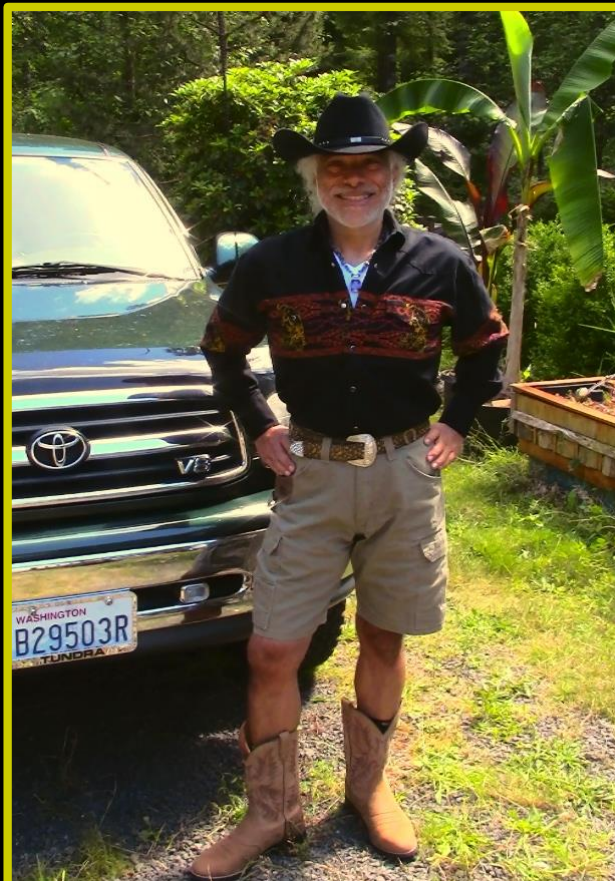


Spearman 0.501;  $p=0.006$



**Feb 2011**  
**120kg (on insulin)**  
**R&L foot ulcers;**  
**Painful neuropathy**

**At diagnosis (2008)**  
**blood glucose 27mM**  
**and HbA1c 12.9%**



**July 2012**  
**74kg**  
**Fasting glucose 4.1mM**  
**Sept 2014 - same**



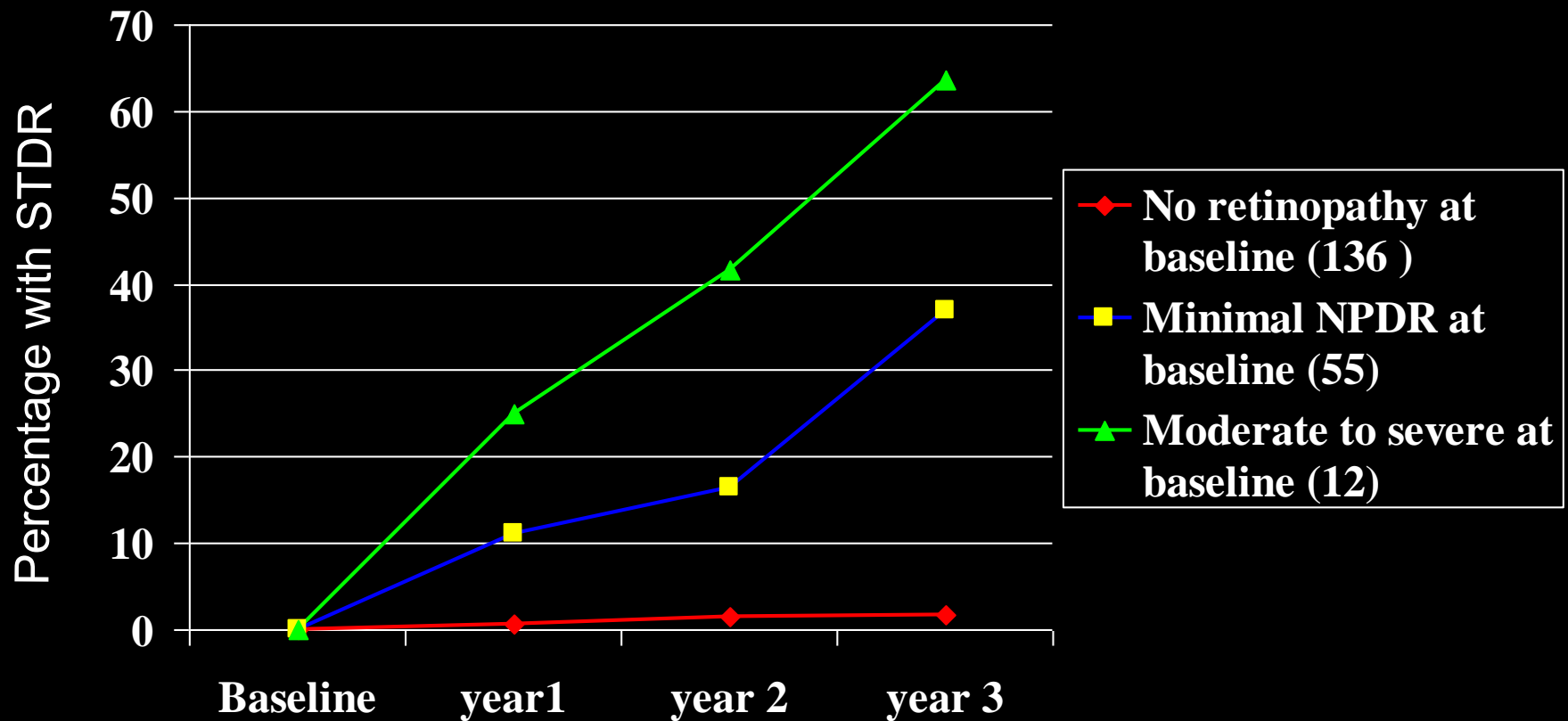
# Type 2 diabetes: Can you reverse Yours?

1. Do you really want to ?
2. Duration – good chance if under 10 years;
3. Amount of weight loss – 15kg is usually enough but more might be needed



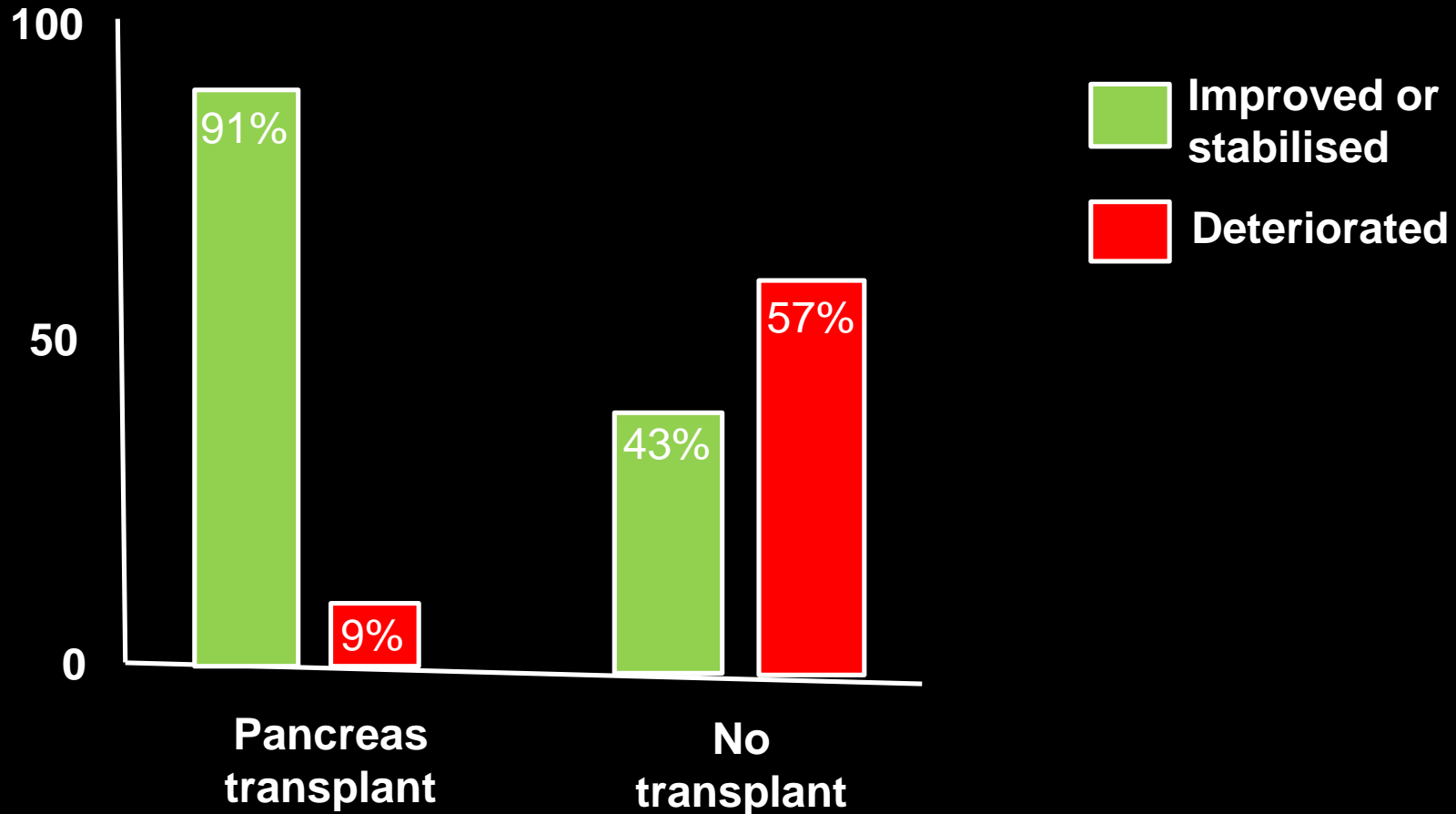


# Percentage of type 2 patients developing sight threatening DR after initiation of insulin therapy

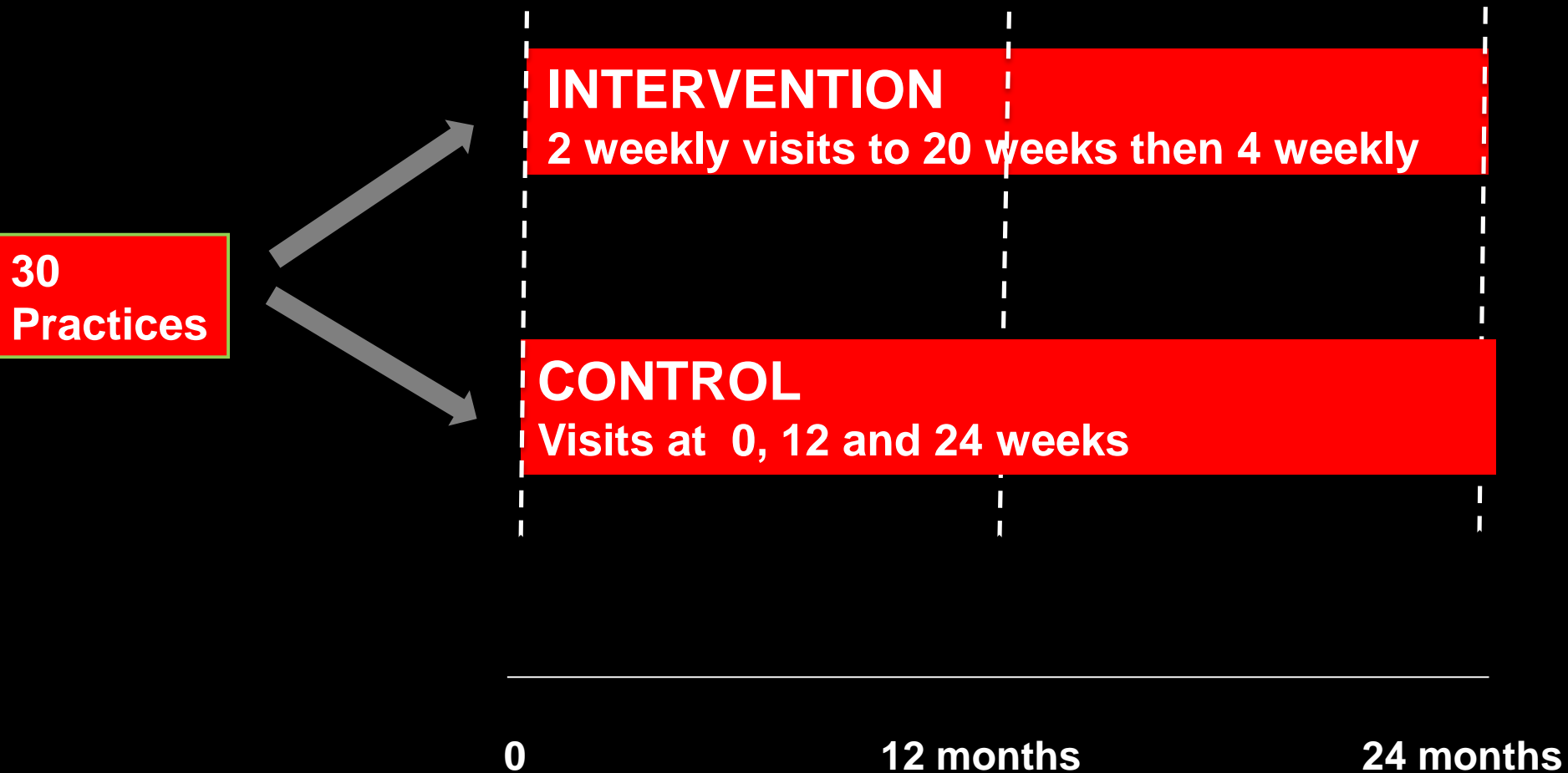




# Effect of normalising blood glucose control in type 1 diabetes by pancreas transplantation



# DiRECT – a study in routine NHS General Practice



# DiRECT – a study in routine NHS General Practice

What proportion of people with type 2 diabetes can be returned to ongoing normal health?

2 weekly visits to 20 weeks then 4 weekly

30 Pr

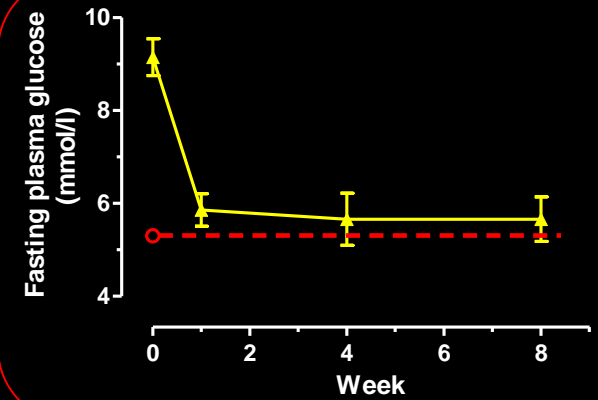
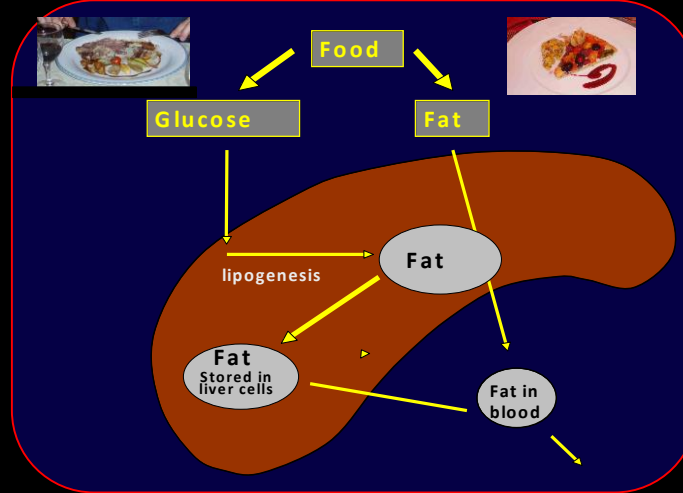
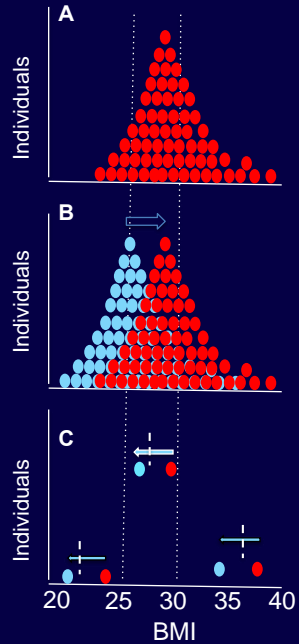
What psychological factors lead to success?

What metabolic changes ensure continuing normal metabolism?

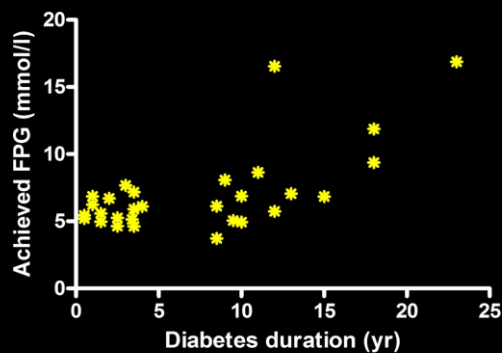
months

# Summary

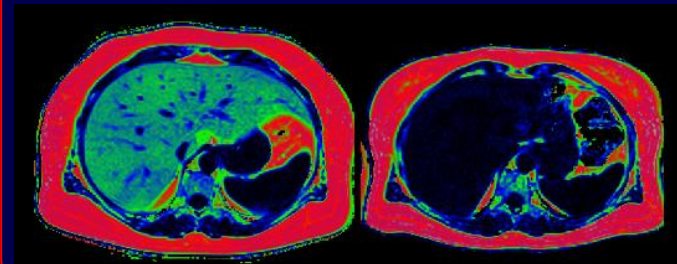
## Personal vs population?



## Effect of diabetes duration



## Liver fat over 8 weeks





**Type 2 diabetes is  
reversible.  
Stay below your  
personal fat threshold**

